a method of solution dyeing a polymeric material during polymerization to form a base color shade, and subsequently dyeing the polymeric material by either yarn dyeing or piece dyeing. Ultraviolet protection is also provided in the solution dyeing step, by introducing an ultraviolet stabilizing agent into the polymer. The base shade may then be transformed into a useful color pallet with enhanced lightfastness properties by applying a final color shade late in the fabric formation process.

REMARKS

Claims 1, 2, 3, 5, 6, 8, 9, 10, 11, 13, 14, and 16 were rejected under 35 USC 103(a) as being unpatentable over Brodmann et al. (US Pat. No. 4,045,601). The Examiner submits that Brodmann et al. disclose a method of dyeing a synthetic material by impregnating a colorant into a polymeric material structure providing a base color shade for the polymeric material and producing yarn from the polymeric material, and externally dyeing said yarn to form a final color shade thereon.

Applicant respectfully submits that Brodmann et al. do not disclose the above described method for dyeing a substrate as claimed by Applicant. Brodmann et al. disclose a "...process for simultaneously resin finishing and dyeing woven glass fabrics..." (col. 1, lines 52-54) wherein the "dyes are unreactive with the glass surface and depend on the resin vehicle for their permanent placement with the fabric." (col. 2, lines 47-50). Thus, Applicant contends that Brodmann et al. disclose a process for dyeing a resin finish, or coating, which has been impregnated on a woven glass fabric in order to achieve the desired level of color on the fabric. Applicant's invention does not require such a finish or coating in order to achieve an optimum level of color in the fabric. Rather, Applicant discloses a method for dyeing a material in a first physical form (the polymeric material structure of claim 1) to provide a base color shade and then assembling it into a second physical form (the substrate of claim 1) and dyeing it to form its final color shade. Furthermore, Brodmann et al. disclose a process for exclusively dyeing woven glass fabric comprised of glass fibers, and since woven glass fabric is not a polymeric material (by definition to those of ordinary skill in the art) as claimed by Applicant, Applicant respectfully submits that Brodmann et al. fail to teach a two step process for dyeing a polymeric material.

Thus, Applicant respectfully contends that Brodmann et al. provide no motivation or suggestion for modifications which would result in a method of dyeing comprising the steps of impregnating colorant into a polymeric material structure to provide a base color shade, assembling a substrate from the polymeric material, and dyeing the substrate to form a final color shade.

Claims 4, 7, 12, and 15 were rejected as being unpatentable over Brodmann et al. in view of Freeman (US Pat. No. 4,902,787) under 35 USC 103(a). The combination of references suggests adding an UV stabilizer to a dyestuff (Freeman) for use in woven glass fabrics (Brodmann et al.). Applicant respectfully submits that this combination lacks recognition of the problems solved by the present invention in having the ability to create an infinite number of color shades using the two step dyeing process wherein the first step dyes the material in a first physical form (the polymeric material structure) and then dyeing the material in its second physical form (the substrate). An UV stabilizer can be added at one or both steps of the process to further enhance the fabric's lightfastness. This process also allows for a reduction in inventory and stock keeping units and also a reduction in customer response time by impregnating the polymeric material structure with a base shade color which can be transformed into a wide variety of different final shades quickly and more efficiently than previous methods. Thus, Applicant respectfully submits that the combination of references fails to recognize or solve the problems associated with previous methods for imparting color and UV stability to fabrics.

Claims 1, 2, 3, 5, 6, 8, 9, 10, 11, 13, 14, and 16 were rejected under 35 USC 103(a) as being unpatentable over Devinney et al. (US Pat. No. 3,775,054). The Examiner submits that Devinney et al. suggest the steps of dyeing a continuous length of yarn with a colorant and externally dyeing the yarn to form a final color shade on and along the length of the yarn. Applicant respectfully submits that Devinney et al. fail to disclose a method for obtaining a final color shade on a substrate as claimed by Applicant. Rather, Devinney et al. disclose an apparatus and method for obtaining a space dyed yarn which does not result in a final color shade on the yarn, but instead results in "an appearance of random color variation therealong by spotting or blending additional colors onto the yarn" (col. 1, lines 37-39) and "a shaded transition between dyed and undyed portions of the yarn." (col. 2, lines 6-7). Additionally, Devinney et al. do not disclose the physical transformation that occurs between the first dye step and the second dye step as claimed by Applicant wherein the polymeric material structure

is first dyed to a base color shade and then it is assembled into a substrate before it is further dyed to form a final color shade (claim 1).

Thus, Applicant respectfully contends that Devinney et al. provide no motivation or suggestion for modifications which result in a method of dyeing comprising the steps of impregnating colorant into a polymeric material structure to provide a base color shade, assembling a substrate from the polymeric material, and dyeing the substrate to form a final color shade.

In view of the above amendments and remarks, it is respectfully requested that claims 1-16 be allowed and that the application be passed to issue.

Respectfully requested,

July 24, 2002

Brenda D. Wentz
Agent for Applicant(s)
Registration Number: 48,643
(864) 503-1597

Serial No. 09/586,202

Version with markings to show changes made:

Abstract (Amended) [A method of solution dyeing a polymeric material during polymerization to form a base color shade, and subsequently externally dyeing the polymeric material by either yarn dyeing or piece dyeing to produce a final color shade. The base shade that is formed may then be transformed into a desired final shade chosen from a wide variety of final shades. Ultraviolet protection is also provided in the solution dyeing step, by introducing an ultraviolet stabilizing agent into the polymeric melt. By providing a yarn or a substrate having a solution dyed base color that may be transformed into a wide variety of different final color shades, inventory is more likely to be utilized rather than wasted. Less inventory space is required, and the process is much more efficient. Material handling costs are decreased with a lower inventory, fewer stock keeping units of starting material are required, and the threat of obsolescence of the remaining inventory is diminished. Further, lightfast qualities in the final product are enhanced, and the final shade may be applied late in the fabric formation process, thus allowing quick response to customer color orders.]

The present invention relates to methods of imparting color and ultraviolet protection to synthetic yarns or substrates. More specifically, the present invention is directed to a method of solution dyeing a polymeric material during polymerization to form a base color shade, and subsequently dyeing the polymeric material by either yarn dyeing or piece dyeing. Ultraviolet protection is also provided in the solution dyeing step, by introducing an ultraviolet stabilizing agent into the polymer. The base shade may then be transformed into a useful color pallet with enhanced lightfastness properties by applying a final color shade late in the fabric formation process.